

SKY SCANNER

National Weather Service Forecast Office
Aberdeen, South Dakota

January 2007



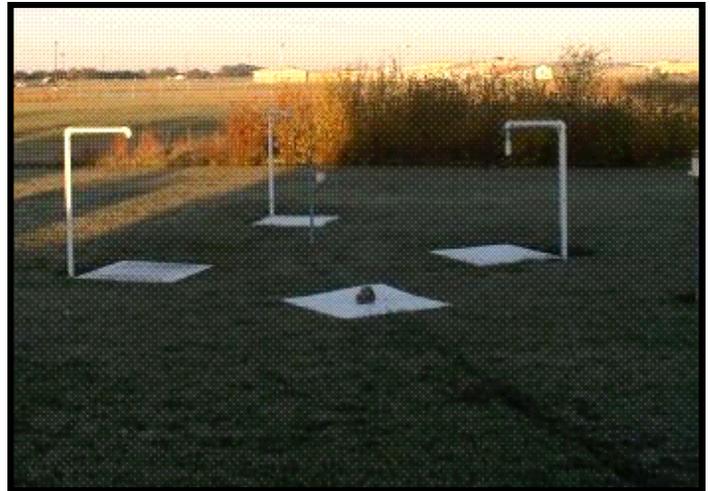
Aberdeen Selected as Test Site for Automated Snow Sensors

The Aberdeen National Weather Service Office, in cooperation with Colorado State University, is participating in a national study on the application and feasibility of using ultrasonic sensors to measure snow depth. Seventeen National Weather Service offices from across the country were selected to participate in the test. The selected sites were chosen in order to test the sensors in as many weather regimes as possible. Aberdeen was selected to test the sensors in cold, wind-blown snow conditions.

The new sonic sensors employ a group of three ultrasonic sensors and determine snow depth by calculating the distance between the sensor and the top of the snow pack using the speed of sound at zero degrees Celsius. Since temperature readings are critical to the calculation, the sensor group also includes a temperature sensor to allow on-the-fly adjustments.

The sensors will be tested for the remainder of this snow season and into the next snow season. Participants are hopeful the test will be a success so the sensors can be deployed to unmanned automated weather stations throughout the country.

Below are some pictures of Aberdeen's ultrasonic snow sensors.



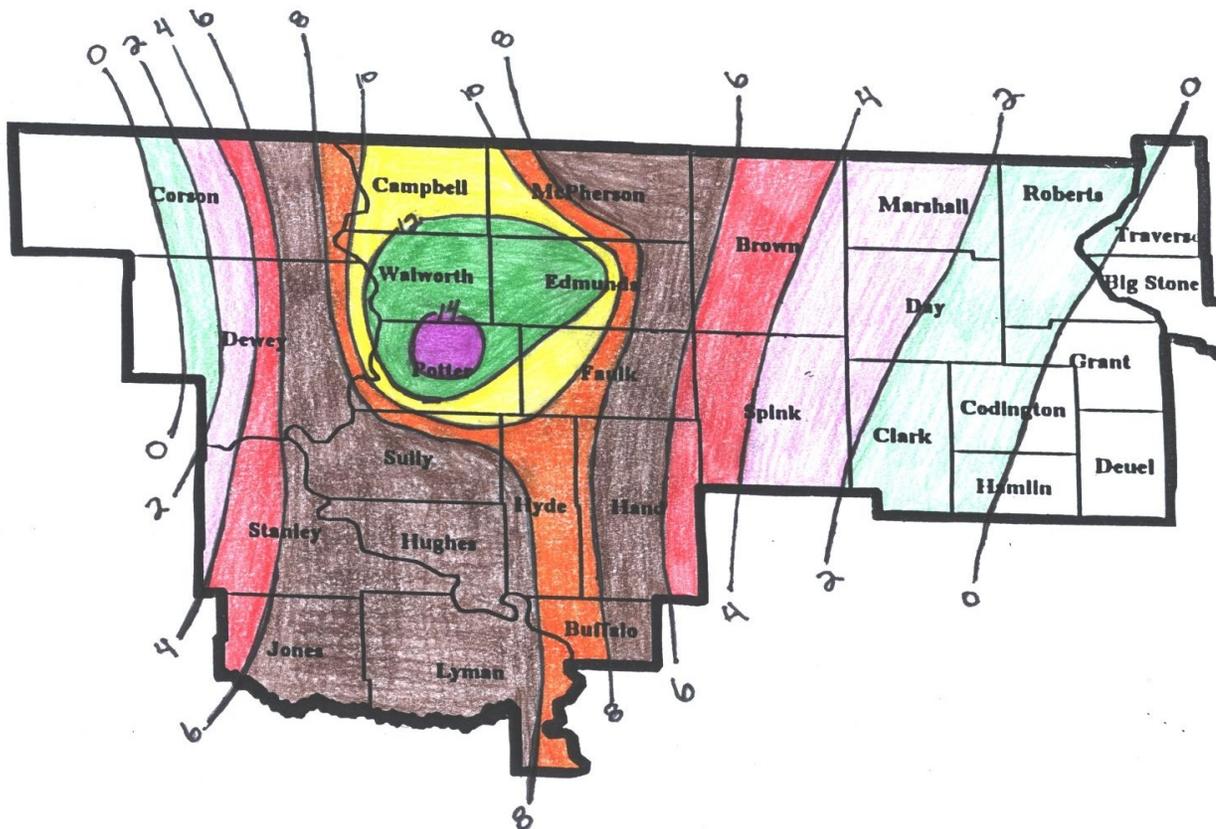
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First Winter Storm of 2006/2007 Season

by Amy Parkin

The first major winter storm of the 2006/2007 season struck South Dakota on December 30th as a strong low pressure system tracked southeast of the state and was accompanied by an upper level disturbance that tracked just to the north of the region. The storm brought a mixture of precipitation types to the area...with heavy snow falling across the central part of the state...a mixture of freezing rain and snow from the James River Valley to the Sisseton Hills...and a mixture of rain and freezing rain east of the Sisseton Hills. Significant icing was reported east of a line from Doland to Webster to Roy Lake State Park...with anywhere from 1/4 to 1 inch of ice accumulation. Farther to the west, the precipitation fell as snow...with the highest amounts occurring just east of the Missouri River. (See chart below for storm snow totals.) Gettysburg reported the most snow...coming in with a total of 15 inches. Due to the warm temperatures during the storm, the snow contained a significant amount of liquid. Some examples of how wet the snow was...the 4.6 inches that fell in Aberdeen contained .70 inches of liquid...the 12.6 inches in Roscoe contained .81 inches of liquid...and the 6.0 inches that fell in Onida contained .50 inches of liquid.

Snow Totals (in inches) – 12/30/2006

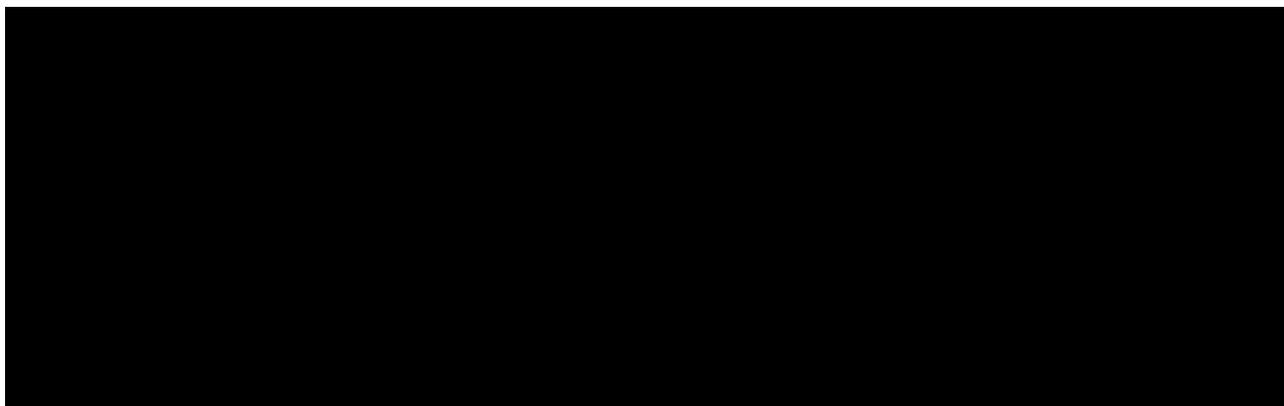


2006...A Record Dry Year

by Dan Mohr

The year of 2006 will go down as one of the driest years on record, especially for central and north central South Dakota. A dry spring and summer led to severe to exceptional drought conditions across central, north central, and northeast South Dakota. The drought affected many communities, from Timber Lake to Mobridge to Aberdeen, down to Redfield and Miller, and west over to Pierre, Murdo, and Kennebec. Even a much wetter than normal September along with a late December heavy snowfall could not keep several locations from having one of the top ten driest years on record. Precipitation records as far back as 1893 show that Timber Lake, Mobridge, Pierre, and Kennebec were among the top seven driest on record. Crops and pastures were devastated by the summer heat, large rainfall deficits, and lightning fires. Tens of thousands of acres of crops and rangeland were destroyed by the drought and the fires.

For seven long-term precipitation recording locations across the area, the following information below shows the total precipitation for 2006 in inches, how much each location was below normal, how they ranked among the driest years on record and the all-time driest year on record. The data shows that for Timber Lake and Mobridge, the 2006 precipitation was only half of the yearly normal precipitation, with Pierre and Kennebec receiving only 60 to 70 percent of their normal precipitation. Precipitation deficits were substantial at all locations, from over 4 inches at Aberdeen and Watertown to up to nearly 9 inches below normal precipitation at Timber Lake and Mobridge. Sisseton finished up 2006 only around an inch below normal.

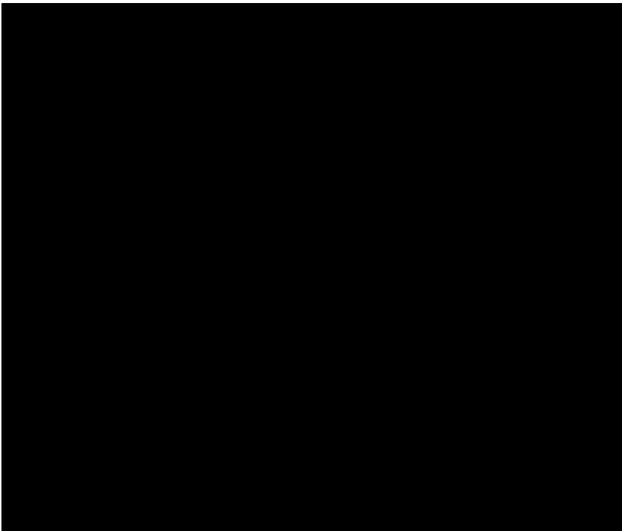
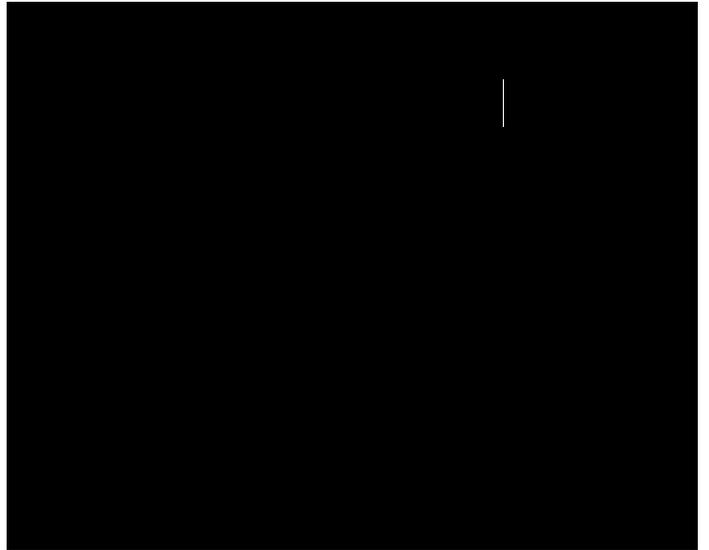
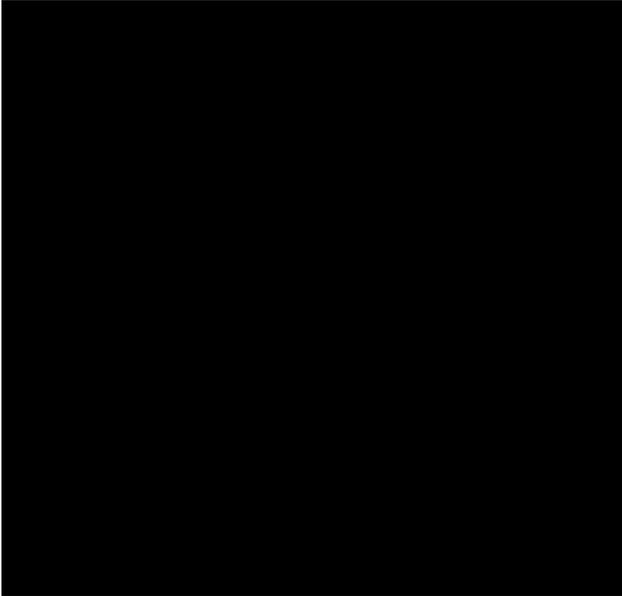


1-605-225-0519

When significant or unusual weather events occur, give us a call! We're always happy to hear from the public, especially if you're calling to report heavy snow, freezing rain, hail, strong winds, or tornadoes. Don't wait until the next day...call us when it's happening.

Snowfall Comparisons

by Scott Doering



Significant Weather of 2006

by Dan Mohr

January through March 2006

The year of 2006 started off pretty uneventful, with a record warm January across the area. The first significant winter weather came on the 11th and 12th of March, where 6 to 9 inches of heavy snow fell across central and north central South Dakota. A much more significant snowfall occurred along and west of the Missouri River from March 18th through March 20th. Heavy snow of 7 to as much as 20 inches fell from the afternoon of the 18th until around noon on the 20th. The South Dakota Department of Public Safety issued a travel advisory for any travel, but especially for the State Basketball Tournament travelers. Interstate 90 was closed on Sunday into Monday morning with many people stranded. Many cars and trucks were stuck on the roads. Many schools and meetings were postponed or canceled.

May 2006

By late May, the lack of winter snowfall and spring rainfall resulted in severe drought conditions developing across north central South Dakota and into parts of central South Dakota. Extensive losses of spring and winter wheat crops were being reported.

June 2006

The continued lack of rainfall resulted in drought conditions expanding in coverage and increasing in intensity across central and north central South Dakota through June. Severe drought conditions expanded across the region with extreme drought conditions developing across north central South Dakota by mid June. The extreme drought conditions expanded southward into central South Dakota by the end of June. Precipitation deficits by the end of the month were from 2 to 2.50 inches below normal. Water supplies and agriculture were greatly affected. Many crops were rated poor to very poor. Ranchers were affected by the short grasses on the pastureland and the fire danger was also a problem through June, with several fires occurring.

A widespread severe weather event occurred on the 13th and 14th of June, with many reports of large hail, some wind damage, and some flash flooding across parts of central, north central, and northeast South Dakota. Many reports of golfball size hail were received, with the largest hail up to the size of tennis balls in southern Mcpherson County. Heavy rains of 3 to 5 inches caused flash flooding in southern Mcpherson and northern Edmunds counties. Wind gusts to 70 mph occurred in Lyman County.

On June 24th, four tornados touched down briefly as a supercell thunderstorm moved quickly southeast from Dewey County across Potter and Sully counties and through Hand County. No damage occurred with these tornados, as they touched down in open areas.

August 2006

The summer of 2006 was unusual for sure, as August had more severe weather than June and July combined. There were several notable severe weather events in August. Specifically, August 9th, 10th, 11th, 12th, 16th, 18th, 20th, 22nd, and the 24th were the most severe. There were many occurrences of high winds and large hail on these days, with severe weather reports in almost every county across central and north central and north-east South Dakota. On August 10th, golfball to baseball-sized hail caused quite a bit of damage in and around Roslyn in Day County. Also on the 10th, 80 mph winds or higher combined with large hail caused quite a bit of damage in Harrold in Hughes County. On August 18th, heavy rains of 4 to 5 inches caused flash flooding in and around Gettysburg.

The big event for August and the entire summer came on August 24th, when six tornados touched down in Mcpherson, Sully, Hyde, and Hand counties. The largest tornados were in southwest Mcpherson County and Hand County. A supercell thunderstorm produced a large tornado in southwest Mcpherson County. The tornado was on the ground for nearly a half hour, and covered about 14 miles. The tornado touched down near the Campbell county line. There were four different sites damaged, with the greatest damage 8 miles south of Eureka and 2 miles southeast of Hillsvie. Damage included numerous power poles snapped off, trees shredded of leaves, bark and/or uprooted. Numerous livestock and deer were killed. Devastating damage was observed to farm equipment, homes, barns, grain bins, and vehicles. A well-anchored mobile home was completely destroyed. Debris from each site was observed up to 3 miles away. One person received minor scrapes and bruises.

Another supercell thunderstorm produced two tornados in Hand County. One tornado touched down west of Miller and destroyed a large barn and a moved a car nearly 20 feet. Well-built structures were heavily damaged, and several were pushed slightly off their foundations. Significant tree damage also occurred. The second tornado touched down south of Vayland in Hand County and tracked southeast and into Beadle County. The tornado formed in a heavily wooded area, tracking along a county road and producing damage to several farmsteads. A mobile home was flipped and destroyed. A grain storage building was flipped onto a car. Several homes had significant roof and window damage. Numerous trees were snapped. Also on August 24th, hail up to the size of softballs caused damage to a farm west of Agar in Sully County.

October through December 2006

The weather from October through December was pretty uneventful, with very little in the way of precipitation until late December. At the end of December, a winter storm brought heavy snow from 6 to as much as 15 inches to much of central, north central, and parts of northeast South Dakota. Also, ice accumulations from freezing rain brought some tree damage and power outages to parts of northeast South Dakota.

What caused the white ice-like substance on this tree?

by Melinda Albrecht

It is called hoar frost, and Aberdeen residents woke up the morning of December 15th to a coating of hoar frost visible on most trees and bushes. This phenomenon usually occurs when you have had fog overnight with air temperatures and dew point temperatures below freezing. The air reaches saturation by cooling the air temperature completely to, or very near the dew point temperature. This creates conditions possible for fog development; typically freezing fog develops in addition to the formation of frost. The scientific definition of hoar frost is “A deposit of interlocking crystals formed by direct sublimation on objects.” (Sublimation: when a molecule changes directly from a gaseous [water vapor] state to a solid [ice] state or vice versa without ever becoming a liquid) Hoar frost typically occurs on objects with a small diameter that are freely exposed to the air, such as tree branches, plants, wires, poles, etc.

The observations from Aberdeen during the early morning hours on the 15th reported a temperature around 17 F above with a dew point temperature around 16 F above. These conditions would yield a relative humidity of 96 percent, with completely saturated air having a relative humidity of 100 percent. Freezing fog was also being reported with visibilities ranging from a quarter mile to around 3 miles throughout those pre-dawn hours. Similar conditions occurred again just last week on the morning of January 2nd in Aberdeen.



This photo of a tree branch covered in hoar frost was taken on the morning of Dec. 15th outside the NWS office in Aberdeen.

National Weather Service in Aberdeen Hosts Winter Preparedness Television Show

by Stan Keefe

As part of Winter Weather Preparedness Week in South Dakota, the National Weather Service in Aberdeen, SD produced a 35-minute television show focusing on preparing for the upcoming winter. The show was a panel discussion with representatives from the National Weather Service, Northwestern Energy, South Dakota Emergency Management, and the South Dakota Highway Patrol. It was produced in the studios of the Aberdeen Area Vo-Tech.

The show focused on the lessons learned from the major ice storm that hit eastern South Dakota last year, and how to apply those lessons in preparing for this year's winter season. The storm, which arrived in eastern South Dakota at the end of the 2005 Thanksgiving Day weekend, caused major damage across the area. Tom Glanzer, Northwestern Energy spokesperson said the storm cost his company \$12 million in damage, and required crews to come in from several surrounding states to help out. Kristi Turman, director of the South Dakota Division of Emergency Management, said the state emergency operations center was opened and staffed 24 hours/day for two weeks as they tried to restore electrical power to rural residents. Trooper Heuerts, from the South Dakota State Highway Patrol, worked in the area hardest hit by this storm and told of efforts to respond to accidents and motorists in distress. Jim Scarlett, Meteorologist-in-Charge of the Aberdeen National Weather Service, talked about the meteorology of the event.

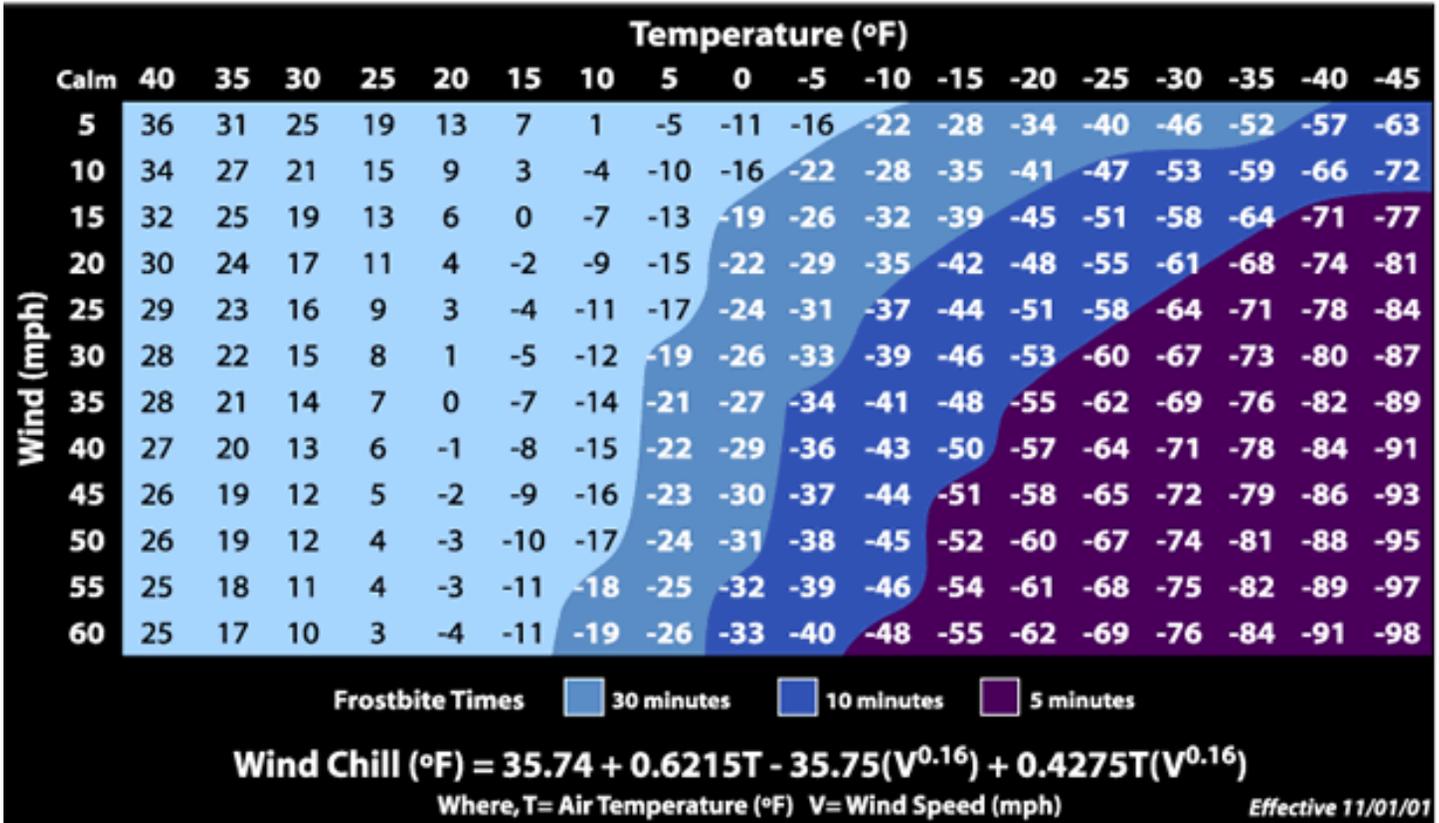
Each of the representatives also discussed what their organizations go through when major winter storms hit the area, as well as the best methods to prepare for the coming winter. Some other topics included how to prepare yourself should you become stranded in your home or car during a winter storm, alternate sources of heat for your home and how to use them safely, what the different winter related products issued by the National Weather Service are and what actions should be taken when they are issued, and what resources are available at both the local and state levels for storm victims. One of the most significant messages to come from this program was the co-operation between Federal, state and local governments as well as public and private entities, and that a close relationship between all agencies results in better service to the public. Another message relayed through the show was that the network of government and private agencies cannot do everything. Individuals must still take responsibility for their own safety.

After the TV show was filmed, all of the participants came to the National Weather Service office where they were guests on a live NOAA weather radio call-in show. The show lasted one hour and was broadcast on all seven transmitters. The radio show was very similar to the TV show, but included a chance for the public to call in and ask questions of our panel of experts. It ended up being an interesting and informative evening.

The TV show aired several times during Winter Weather Preparedness Week on the cable access channel in Aberdeen. DVD copies were produced and sent to all of the cable television operators in the Aberdeen area of responsibility, with a note asking them to consider playing it. We have followed up with a survey to the cable TV operators asking if they used it and what suggestions they may have for future shows.



NWS Windchill Chart



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One kind word can
 warm three winter
 months.
 Japanese proverb

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